**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF PENNSYLVANIA**

CARNEGIE MELLON UNIVERSITY,

      Plaintiff,

    v.

MARVELL TECHNOLOGY GROUP, LTD.
and MARVELL SEMICONDUCTOR, INC.,

      Defendants.

Civil Action No. 2:09-cv-00290-NBF

**MARVELL'S OPPOSITION TO PLAINTIFF'S MOTION FOR JUDGMENT AS A
MATTER OF LAW ON MARVELL'S INVALIDITY DEFENSES**

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I.   INTRODUCTION

Defendants Marvell Technology Group, Ltd. and Marvell Semiconductor, Inc.

("Marvell") oppose Plaintiff Carnegie Mellon University's ("CMU") Motion For Judgment as a

Matter of Law on Marvell's Invalidity Defenses ("CMU's JMOL").

II.   LEGAL STANDARDS

Judgment as a Matter of Law: Judgment as a matter of law "should be granted

sparingly." *Lightning Lube, Inc. v. Witco Corp.*, 4 F.3d 1153, 1166 (3d Cir. 1993). "[A] grant of

JMOL is appropriate only where a party has been fully heard on an issue during a jury trial and

the court finds that a reasonable jury would not have a legally sufficient evidentiary basis to find

for the party on that issue." *Agrizap*, 520 F.3d at 1342. When determining whether a "legally

sufficient evidentiary basis" exists, the Court must "examine the record in the light most

favorable to the non-movant… and afford it the benefit of all reasonable inferences."

Nobelpharma AB v. Implant Innovations, Inc., 141 F.3d 1059, 1064 (Fed. Cir. 1998).

The court must determine whether the evidence and all justifiable inferences most

favorable to the non-movant afford any rational basis for a verdict in its favor. Judgment as a

matter of law cannot be granted if "reasonable minds could differ as to the import of the

evidence." Nobelpharma, 141 F.3d at 1064.   Judgment as a matter of law "should be granted

only if, viewing all the evidence which has been tendered and should have been admitted in the

light most favorable to the party opposing the motion, no jury could decide in that party's favor."

Walter v. Holiday Inns, Inc., 985 F.2d 1232, 1238 (3d Cir. 1993).

Anticipation: "A patent is invalid for anticipation if a single prior art reference discloses

each and every limitation of the claimed invention." *Schering Corp. v. Geneva Pharms., Inc.*,

339 F.3d 1373, 1377 (Fed. Cir. 2003); *SmithKline Beecham Corp. v. Apotex Corp.,* 439 F.3d

1312, 1324 (Fed. Cir. 2006).

Obviousness: A patent is invalid as obvious "if the differences between the subject

matter sought to be patented and the prior art are such that the subject matter as a whole would

have been obvious at the time the invention was made to a person having ordinary skill in the art

to which said subject matter pertains." 35 U.S.C. § 103(a). "The combination of familiar

elements with known methods is obvious when it provides no functionality except for yielding

predictable results." *AdvanceMe Inc. v. RapidPay*, 509 F. Supp. 2d 593, 610 (E.D. Tex. 2007);

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 415-416 (2007). A patent is obvious when "one of

skill in the art could easily view the prior art and make the common sense leap" to the asserted

claims. *AdvanceMe*, 509 F. Supp. 2d at 625. "[W]hen a patent simply arranges old elements

with each performing the same function it had been known to perform and yields no more than

one would expect from such an arrangement, the combination is obvious." *KSR,* 550 U.S. at 417

(quotation omitted).

While a challenger has the burden of showing invalidity by clear and convincing

evidence, that burden is more easily carried where, as here, the challenger relies on prior art that

was not presented to or considered by the examiner during prosecution. *Am. Hoist & Derrick*

Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1359 (Fed. Cir. 1984); *Uniroyal, Inc. v. Rudkin-Wiley*

Corp., 837 F.2d 1044, 1050 (Fed. Cir. 1988) (finding that "reliance upon [art not considered by

the PTO] when that art is more pertinent than the art considered by the PTO may facilitate

meeting the burden of proving invalidity"); *Roche Palo Alto LLC v. Ranbaxy Labs. Ltd.*, 2009

U.S. Dist. LEXIS 90804, at *140 (D.N.J. Sept. 30, 2009) (finding that "the Federal Circuit has

stated that a challenger's burden of showing invalidity by clear and convincing evidence may be

more easily carried when relying on prior art that was not considered during patent prosecution")

(citing *Uniroyal*, 837 F.2d at 1050).

III.   ARGUMENT

A.   Dr. Proakis Testified That The Worstell Patent Discloses the Selection and Application of Signal-Dependent Branch Metric Functions

Dr. Proakis provided ample testimony that the Worstell patent anticipates each and every

element of the CMU asserted claims. Dr. Proakis first explained the disclosure in the Worstell

patent to the jury by providing an overview of how Equation 20 in the Worstell patent discloses

correlated noise, and further, how the "further modified" branch metric in column 10 of the

Worstell patent discloses signal dependent noise. Trial Tr. (12/17/12) at 59-61. Dr. Proakis

proceeded with his anticipation analysis using the proper legal framework by (1) applying

Court's constructions to his opinions (*id.* at 67-68) and (2) providing the necessary element-by-

element analysis required for proving anticipation (*id.* at 63-64). Dr. Proakis then testified that

the Worstell patent discloses the preamble (*id.* at 63), the "selecting" step (*id.* at 67) and the

"applying" step (*id.* at 67-68) of claim 4 of the '839 patent. Dr. Proakis testified that the

Worstell patent also disclosed the "receiving" step of claim 2 of the '180 patent, and that his

analysis for all other elements was identical to that which he already provided for claim 4 of the

'839 patent. *Id.* at 70-71.

Contrary to CMU's assertion, Dr. Proakis testified that the Worstell patent teaches

modifying each branch in the trellis, not just the "one branches." Dr. Proakis testified that col.

10:48-50 of the Worstell patent discloses modifying the branch metric to take into account

transition noise. Trial Tr. (12/17/12) at 67-69, 92-94; D-Demo 12-13-15. When describing the

modification to account for transition noise (i.e., signal dependent noise), the Worstell patent

discloses that "each" branch metric can be modified: "If it is assumed that the standard

deviation of the noise component of each sample is greater where there is a transition in the signal written to the disc than where there is no transition, then *each branch metric* can be modified by multiplying the *metrics* which correspond to transitions by a fraction *which depends on the transition noise standard deviation*." *Id*. at 10:50-56.
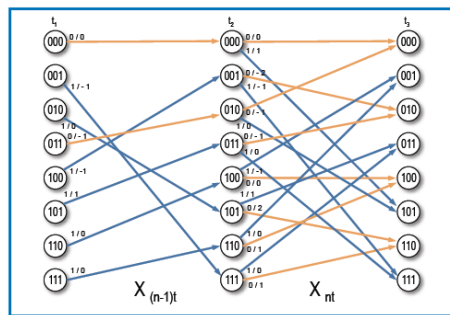
As Dr. Proakis testified on direct and cross-examination, there are sixteen possible branches in the Worstell patent trellis he annotated in D-Demo 12-15 – eight branches that will have transitions (blue "one branches") and eight branches that will not have transitions (orange "zero branches"). Trial Tr. (12/17/12) at 67-69, 92-94. Dr. Proakis testified that according to the "further modified" disclosure in the Worstell patent, one $1/\sigma^2$ would be multiplied by the metric to obtain a further modified metric for the blue "one branches," and a different $1/\sigma^2$ would be multiplied by the metric to obtain a different further modified metric for the orange "zero branches." *Id.* at 67-69, 94. Dr. Proakis testified that the Worstell patent discloses that one of two different $1/\sigma^2$ will be applied to each of the branch metrics. *Id.* Dr. Proakis did not admit that the Worstell patent fails to disclose modification of the "zero branches." As shown in D-Demo 12-15, reproduced below, Dr. Proakis testified that the branch metric equations for the "zero branches" would be modified by the term $[1/\sigma_{2,nt}^2]$:

The Worstell Patent Discloses "selecting...a set of signal-dependent branch metric functions"

Worstell Patent, Figure 4 (annotated)

D-Demo12-15

(D-Demo 12-15). As part of his opinion for anticipation, Dr. Proakis explained that the "zero"

branches—the orange branches—were modified as shown in equation ② in the demonstrative.

CMU asserts that as Dr. Proakis failed to prove the Worstell patent anticipates the

asserted CMU claims, basing its entire argument on the cross examination of Dr. Proakis relating

to one particular "straightforward" implementation of the Worstell disclosure where the "one

branches" are modified. CMU asserts that Dr. Proakis "conceded" on cross-examination that the

Worstell patent does not explicitly disclose the application of a signal-dependent branch metric

function to the "zero branches." CMU's JMOL at 3. CMU asserts that Dr. Proakis' use of the

word "obvious" when being cross-examined on the "straightforward" implementation disclosed

in the Worstell patent "is an admission that the particular limitation is not disclosed in the cited

art." *Id.* CMU's argument misstates Dr. Proakis' testimony.

As discussed above, the Worstell patent discloses that "each branch metric" can be

modified. On cross-examination, CMU focused on one implementation of the Worstell

disclosure – not on the broad disclosure in the prior sentence of modifying each branch metric

values for the trellis. CMU highlighted the following sentence from column 10:56-59 of the

Worstell patent for Dr. Proakis on cross examination: "***Implementing*** this in a fairly

straightforward way would require eight multipliers, one for each 'one' branch leading to each

state in the appropriate trellis diagram." Trial Tr. (12/17/12) at 94 (emphasis added). When

asked if the Worstell patent disclosed "put[ing] any kind of multiplier on the zero branch," CMU

was referring to the particular implementation at column 10:56-59. Dr. Proakis testified that the

reason for only having eight multipliers was obvious, stating:

> [I]f I have a sigma one squared for no transitions equal to two and a sigma – and a
> sigma squared with transitions equal to six, I can eliminate any of those
> multipliers because what's important here is the relative value between the six and
> the two. So I can eliminate eight multipliers and only get by with eight.

Id. Dr. Proakis went on to testify that implementing sixteen multipliers would lead to

unnecessary additional circuitry, which is why the embodiment at column 10:56-59 having eight

multipliers would make sense to one of ordinary skill in the art reading the Worstell patent. *Id*.

at 95 ("That would require circuitry, so why should you go through another eight multipliers?").

Dr. Proakis was not testifying that the implementation of the eight "one branch" multipliers at

column 10:56-59 was the basis for his anticipation analysis or that the Worstell patent failed to

disclose modification of the "zero branches." He testified that there was an obvious reason why

only eight multipliers (instead of sixteen) in the Worstell patent were disclosed as one

"straightforward" implementation of the Worstell patent. And when CMU's counsel continued

to press on the "difference" it was attempting to fabricate, Dr. Proakis unequivocally stated there

was no difference:

> Q. And, nevertheless, that's a difference between Worstell and the Kavcic patents,
> right?
> A. I don't consider it a difference. In fact, I have looked at the two equations, the
> Equation 13 and this equation, and the modified equation in Worstell, side by
> side, and they take into account the same in the same way, the correlated noise

and the signal dependent noise. I can prove it to you; I've done it mathematically, and I know that.

Id. at 95. Dr. Proakis' testimony that $1/\sigma^2$ is applied to each branch in the Worstell patent "further modified" branch metric is unaffected by a sentence in the Worstell patent that discusses one "straightforward" implementation of the algorithm. The disclosure of that single embodiment cannot detract from the broad teaching that each branch metric can be of modified.

Dr. Proakis' anticipation analysis is that the Worstell patent's equation 20 in light of the disclosure of the "further modified" branch metric in column 10 discloses each and every element of the CMU asserted claims. *Id.* at 59-61, 67-68. More specifically, the "transition noise standard deviation" in the "further modified" disclosure of the Worstell patent is mathematically represented by $1/\sigma^2$. *Id.* And in light of that disclosure, the Worstell patent discloses the "selecting" steps of the asserted CMU claims.[1] *Id.* Furthermore, that disclosure in conjunction with Equation 20 of the Worstell patent discloses the "applying" steps and "receiving" step of the CMU asserted claims.

The fact that Dr. Proakis testified that there are obvious reasons for implementing eight multipliers (reduced circuitry) instead of sixteen multipliers does not reduce his anticipation analysis into an obviousness analysis. Accordingly, CMU's eight undisclosed "zero branch" multipliers theory is a red herring and should be disregarded by this Court.

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[1]   As Dr. Proakis pointed out, CMU's expert Professor McLaughlin and inventor Dr. Moura readily admitted that the $1/\sigma^2$, or variance, disclosed the "selecting" step and a "set of functions" when asked about it in other Viterbi algorithms, including the Zeng Article, the Lee Article, and Equation 10 of the CMU patents. *Id.* at 56-57.

B.   Dr. Proakis' Prior Testimony is Not "Contradictory" or Even Relevant to Marvell's Invalidity Defense Given That it is Based on a Construction of "Function" the Court Has Already Ruled is Not Applicable to This Trial

CMU seeks to strike Dr. Proakis' trial testimony that the Worstell patent discloses a set of branch metric functions based on the Court's claim construction of the word "function." CMU asserts that his trial testimony on this subject is "directly contradicted" by his prior Declaration that the Worstell patent did not meet one of the claim elements. *See* Dkt. #318-3. CMU argues that Dr. Proakis is precluded from providing the allegedly new opinion that the Worstell patent meets the claim elements based on the Court's claim construction. As explained below, Dr. Proakis opinion at trial was not "new." Dr. Proakis' expert report states that the Worstell patent meets all the claim elements based on the Court's claim construction. Moreover, CMU failed to object as to scope to when Dr. Proakis provided his opinion during direct examination and therefore waived any scope objection.

Further, Dr. Proakis' trial testimony did not contradict the testimony in his prior Declaration. Dr. Proakis' trial testimony addressed whether the Worstell patent anticipated based on the Court's construction for "function" applicable to this trial, whereas the opinions expressed in his prior Declaration were based on what the Court has already ruled was an "incorrect" construction. *See* Dkt. # 337 at 16, fn. 9. Given that the opinions were premised on different claim constructions, there is no "contradiction," let alone any grounds to strike Dr. Proakis' testimony. As such, if anything should be stricken from the trial record, as should be the testimony CMU solicited from Dr. Proakis based on an "incorrect" claim construction, leaving the jury with the impression Dr. Proakis somehow changed his opinion.

1.   Dr. Proakis' Trial Testimony Was Based On The Court's Claim Construction And CMU Waived Any Objection As To Scope For That Testimony

Dr. Proakis testified on direct examination that he based his opinions at trial on the

Court's claim constructions. Trial Tr. (12/17/12) at 66-67. Based on those constructions, Dr.

Proakis testified that the Worstell patent met every element of the asserted claims, including the

"selecting" step of the claims. *Id*. at 67. This was not a new opinion for Dr. Proakis. Dr.

Proakis provided this same opinion in his expert report submitted on March 2, 2012.

At paragraph 182 of his expert report, Dr. Proakis stated that the Worstell patent

"discloses selecting a branch metric function for each of the branches at a certain time index."

See Proakis Expert Report at ¶182. In Appendix 10 of his expert report, Dr. Proakis provided an

element-by-element analysis showing how the Worstell patent anticipated the asserted claims.

Dr. Proakis stated that he was applying the Court's claim construction in exactly the same

manner that CMU applied it for purposes of infringement. *Id*. at ¶180. Thus, if CMU applied

the Court's construction correctly (which is CMU's position), Dr. Proakis has not "changed" his

testimony as CMU asserts and the basis for its motion is erroneous.

Moreover, CMU did not object as to scope to Dr. Proakis providing his anticipation

opinion based on the Court's claim constructions. To the contrary, CMU stated that Dr. Proakis

needed to first address the claim construction that he was utilizing for the "selecting" step.   Trial

Tr. (12/17/12) at 65-66. Dr. Proakis thereafter testified, over no objection as to scope, that he

was applying the Court's claim constructions "in comparing the limitations found in each of the

asserted claims to the prior art references." *Id*. at 67. Based on those construction, he testified,

again with no objection as to scope, that the Worstell patent disclosed the "selecting" and

"applying" steps of the asserted claims. *Id*. at 67-68. CMU instead choose to cross examine Dr.

Proakis based on an alleged discrepancy between his trial testimony and his prior Declaration.

Thus, any objections to the scope of Dr. Proakis' testimony utilizing the Court's claim

constructions at trial were waived. The appropriate time to raise an objection is as soon as the

party knows or reasonably should known of the grounds for objection. *Government of The Virgin Islands v. Archibald*, 987 F.2d 180, 184 (3d Cir. 1993). Here, CMU did not assert its objection to Dr. Proakis' testimony during his direct examination while the testimony was being solicited. Given that CMU surely knew the grounds for its objection at that time, its request to strike the testimony is not timely under Rule 103(a)(1) of the Federal Rules of Evidence. *Id*.

> **2.   Dr. Proakis' Trial Testimony On The Worstell Patent Meeting The "Selecting" Step Was Not Contradicted By His Prior Declaration**

CMU asserts that Dr. Proakis' trial testimony is "directly contradicted" by his prior Declaration (Dkt. #318-3) filed in connection with Marvell's 2nd summary judgment motion. CMU JMOL at 4. That is not correct. Dr. Proakis' statements in that declaration were based on an incorrect claim construction. Under that incorrect construction, Dr. Proakis's stated that neither the CMU patents nor the Worstell patent met the "selecting" step requirement for the "set of branch metric functions." However, that statement is not inconsistent with later opining that under the proper construction of the claims, the "selecting" step is met by both the CMU patent embodiments and the Worstell patent.

Dr. Proakis based his prior declaration on his (as well as Marvell's) understanding of how the Court interpreted the claim term "function" set forth on page 16 of its Opinion on Marvell's 1st summary judgment motion (Dkt. # 306) regarding the scope of the term "function." The Declaration set forth opinions that neither the CMU patents nor the Worstell patent met the "selecting" step requirement for the "set of branch metric functions." Dr. Proakis stated that "[t]o the extent the Worstell patent does not disclose the claimed 'selecting' step of the Group I claims, then neither do the CMU patents, if the claims are construed consistently between the patents." *See* Dkt. #318-3 at ¶ 20. For the equations of the CMU patents, Dr. Proakis stated that "the 'variance dependent' branch metric equation (equation 10) is a 'single' branch metric

function and not a 'set of branch metric functions.'" *Id*. at ¶ 43. Similarly, Dr. Proakis stated that

"Worstell's 'further modified' branch metric is a 'single' branch metric function and not a 'set'

of branch metric functions." *Id*. at ¶ 34.

The Court denied Marvell's 2nd motion on April 10, 2012. *See* Dkt. # 337.   In doing so,

the Court noted that the premise for Marvell's motion, namely, Marvell's understanding of the

Court's construction of the term "function," was "incorrect." *Id*. at 16, fn. 9. The Court also

noted that it was "apparent that the Court's use of the imprecise term 'variable' [was] at the heart

of the current dispute." *Id*. 14. The Court then preceded to clarify its construction for the term

"function" and ruled that in order to determine if a function is a "single" function or a "set of

functions," one needed to distinguish between "inputs," "outputs," "parameters" and "constants."

Id. at 12-13.[2] Based on this clarified construction, the Court ruled that CMU's Equation 13 was

a "set" of functions and denied the motion. *Id*. at 17.

In light of the above history, there can be no legitimate dispute that Dr. Proakis'

Declaration is premised on what the Court has already ruled is an "incorrect" construction for the

term "function" that relied on an "imprecise" use of the term "variable," which Dr. Proakis'

Declaration (of course, signed prior to that ruling) was squarely addressing. Given the difference

between the constructions, there is no "contradiction" in Dr. Proakis' trial testimony. In fact, it is

not unusual for claim limitations to be either present or absent in a prior art reference depending

upon how that limitation is construed. And this case is no exception. Based on Dr. Proakis'

original understanding of the Court's construction for "function" (where adding a "variable"

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2   The Court also noted that "[i]ndeed, the United States Court of Appeals for the Federal Circuit has observed that 'district courts may engage in a rolling claim construction, in which the court revisits and alters its interpretation of the claim terms as its understanding of the technology evolves.'" Dkt # 337 at 9 (*citing Guttman, Inc. v. Kopykake Enterprises, Inc.*, 199 F.3d 1295, 1299 (Fed. Cir. 1999).

does not convert a single function into multiple functions), both the Worstell branch metric equation and the CMU equations were a "single" function, for the reasons set forth in his Declaration.

However, based on a clarified construction (where distinctions between "parameters" and "inputs" are relevant), the Worstell branch metric equation is a set of "functions," for the reasons Dr. Proakis testified to at trial. *See, e.g.,* Trial Tr. (12/17/12) at 67-68. Accordingly, CMU's claim of "direct contradiction" is not supported by record in this case.

Furthermore, given that the jury will be instructed on the proper construction of "function" based on the Court's 2nd summary judgment ruling, and not the construction used in Dr. Proakis' Declaration, the opinion he expressed therein is not even relevant to Marvell's invalidity defense. If anything, it is confusing and prejudicial given that the jury will not be informed of the earlier summary judgment proceedings, including the fact that Dr. Proakis' prior Declaration was based on a claim construction that the Court has already ruled was "incorrect." Trial Tr. (12/17/12) at 107-8.

Even if the opinions expressed at trial were contradicted by the prior Declaration, that would not provide a basis for the severe sanction of striking the testimony. The exclusion of evidence for such a discovery violation is an "extreme sanction" that is normally reserved for a "showing of willful deception or 'flagrant disregard' of a court order by the proponent of evidence." *Konstantopoulos v. Westvaco Corp.*, 112 F.3d 710, 719 (3d Cir. 1997) (quoting *Meyers v. Pennypack Woods Home Ownership Ass'n*, 559 F.2d 894, 905 (3d Cir. 1977)).

C. Dr. Proakis Applied The Court's Construction Of "Signal-Dependent Branch Metric Function"

CMU asserts that Dr. Proakis applied an "incorrect" construction of the phrase "signal-dependent branch metric function." CMU JMOL at 7. CMU is not correct. Indeed, Dr. Proakis

testified that he "used the Court's construction" when asked for "purposes of your analysis in this case, what did you use as the source for the constructions of the terms and phrases that you applied?" Trial Tr. (12/17/12) at 66:17-67:8. The Court's construction included the constructions of "signal-dependent branch metric function" and "signal-dependent noise." Dr. Proakis testified that he applied all of the Court's constructions. To the extent CMU believed Dr. Proakis used a different construction from what he testified to, it was free to cross-examine him on any alleged discrepancy, which it chose not to do.

During his direct testimony, Dr. Proakis carefully walked through each of the steps in both asserted claims and explained how those steps were present in the Worstell patent. His analysis and testimony clearly included the "selecting" step of both asserted claims. See, e.g., Trial Tr. (12/17/12) at 67:9-20 (for claim 1, '839 patent, describing "where the selecting limitation in your opinion is found in the Worstell prior art reference"); id. at 71:5-12 (testifying that his analysis is "exactly the same" for claim 2 of the '180 patent as it was for claim 1 of the '839 patent for the same "selecting" step); id. at 68:7-11 ("Yes, my opinion is that every limitation, every element of this claim [4 of the '839 patent] is disclosed in the Worstell patent").

In addition, given that the "selecting" step requires selecting from a "set of signal dependent branch metric functions," Dr. Proakis also explained in detail how the "further modified" branch function of the Worstell patent disclosed exactly what the asserted claims required in that respect. See, e.g., Trial Tr. (12/17/12) at 60:1-21 (providing background on how Worstell addresses "signal dependent noise" through a "further modified" branch metric function); id. at 67:9-20 (discussing how Worstell addresses "signal dependent noise" in the context of the "selecting" step requiring selection from a "set of signal dependent branch metric functions"); id. at 68:12-69:10 (discussing D-Demo12-15 entitled "The Worstell Patent

Discloses "selecting . . . a set of signal-dependent branch metric functions").

In light of the above, Dr. Proakis clearly applied the Court's construction of "signal-dependent branch metric function" during his testimony on direct, which CMU was free to challenge on cross-examination. Accordingly, CMU's request for judgment as a matter of law that the Worstell patent does not disclose the subject limitation is not supported by the trial record and should therefore be denied.

D.   There is Substantial Evidence That the Worstell Patent Alone Renders The CMU Asserted Claims Obvious

CMU asserts that Dr. Proakis' testimony regarding the obviousness of the CMU asserted claims were "conclusory and factually unsupported," and on that basis, asks the Court to rule as a matter of law that the asserted claims are valid. CMU's position is again based on the faulty premise it raised earlier in its brief and Marvell addressed above. Specifically, CMU argues that "Dr. Proakis all but agreed that the Worstell reference does not disclose any 'transition noise adjustment multiplier' on the non-transitional or 'zero' branches." CMU JMOL at 9-10. Piecing CMU's "zero branch multiplier" theories together, it first asserts that because the Worstell patent only discloses eight multipliers (for the "one branches"), Dr. Proakis' testimony regarding anticipation falls short because there is no disclosure of the other eight "zero branch" multipliers. *See* CMU's JMOL at Section III.A. Then, CMU asserts that since Dr. Proakis' explained the reasons for why those "zero branch" multipliers were not necessary – that a person of ordinary skill in the art reading the Worstell patent would understand that using simple math avoided additional circuitry – CMU asserts that his obviousness opinions are also conclusory and should be disregarded. *See* CMU's JMOL at Section III.C.

CMU is trying to convince this Court that Dr. Proakis' testimony (for anticipation and obviousness) centers around the implementation details of whether eight or sixteen multipliers

are necessarily disclosed in the Worstell patent. Again, the fact that there may be eight

multipliers for the "one branches" but none for the "zero branches" in one implementation in the

Worstell patent has no bearing on Dr. Proakis' anticipation opinion. Dr. Proakis very clearly

explained why one of ordinary skill in the art would know that it was unnecessary to use "zero

branch" multipliers in one implementation. His anticipation opinions are not based on whether

there are eight or sixteen multipliers in that particular implementation. *See supra.* Similarly, Dr.

Proakis' opinions regarding obviousness were not based on whether the "straightforward"

implementation the Worstell patent is missing a set of multipliers.

Instead, Dr. Proakis' obviousness opinions are focused on whether the "transition noise

standard deviation" in the Worstell patent is "constant" across all branches and time, which is the

position CMU and its expert Professor McLaughlin have taken during this litigation in

attempting to rebut Marvell's invalidity positions. *See, e.g.,* Dkt. # 423, Memorandum Opinion

re: Motion Reconsider Written Description SJ Order, at 7 (*citing* Dkt # 325-2, McLaughlin Dec.

at ¶ 31). On direct, Dr. Proakis was asked to assume CMU's position regarding a "constant"

"transition noise standard deviation" was correct for the purposes of his obviousness analysis.

Dr. Proakis then testified that it would make no sense whatsoever for the sigma to be constant,

but if that were the case, it would be obvious to one of ordinary skill in the art to vary the sigma

squared in the Worstell patent from branch to branch. Trial Tr. (12/17/12) at 75-77. CMU then

cross-examined Dr. Proakis on the use of the word "constant" in the Worstell patent and he

testified why CMU was misinterpreting the disclosure in the Worstell patent. CMU's brief does

not raise any issues with respect to Dr. Proakis' obviousness opinions with respect to a

"constant" sigma, and accordingly has waived the right to seek a judgment as a matter of law

based on them. *See, e.g., Duro-Last, Inc. v. Custom Seal, Inc.*, 321 F.3d 1098, 1102 (Fed. Cir. 2003).

Even if Dr. Proakis' obviousness analysis hinged on the allegedly missing "zero branch" multipliers from the "straightforward" implementation (it does not), CMU would nonetheless be incorrect that his obviousness opinions were conclusory and unsupported. CMU asserts that "Dr. Proakis did not, however, identify ***how*** or ***why*** a PHOSITA, reading Worstell, would know or be motivated to apply such a multiplication to the non-transitional 'zero' branches. CMU JMOL at 10 (emphasis in original). But he did. First, CMU does not dispute Dr. Proakis' expertise in this field. *See* Trial Tr. (12/17/12) at 52-54. It is entirely proper for Dr. Proakis to apply his expertise when rendering his obviousness opinions.

After testifying that the Worstell patent explicitly discloses applying two different $1/\sigma^2$ to different branches (as even CMU's JMOL at 10 points out), Dr. Proakis did not simply testify that "it was obvious to a person of ordinary skill in the art" – he explained ***why***. To be clear, this straw man argument CMU is now raising is a simple matter of only two design choices for one of ordinary skill in the art to make, either sixteen multipliers or eight multipliers. Dr. Proakis testified ***why*** a person of ordinary skill in the art would read the Worstell patent and understand simple math well enough to understand how to eliminate eight of the multipliers in one implementation, "because what's important here is the relative value between" the two different sigma values. Trial Tr. (12/17/12) at 94. Dr. Proakis further explained ***why*** only having eight multipliers is an implementation detail that one of ordinary skill in the art would understand – to avoid unnecessary circuitry. *Id*. at 94-95. If one of ordinary skill in the art would understand they can eliminate eight multipliers, as Dr. Proakis testified, it is plain that they would likewise would read the Worstell patent and understand the only other option (not eliminating the eight

multipliers in the implementation). Indeed, the Worstell patent explicitly discloses that "each branch metric" can be modified. Of course, that opinion goes hand-in-hand with Dr. Proakis' testimony that the "further modified" branch metric in column 10 of the Worstell patent discloses scaling eight branches by one $1/\sigma^2$ and scaling the other eight by a different $1/\sigma^2$. *See* CMU JMOL at 10 (citing Trial Tr. (12/17/12) at 94:7-94:8).

E. Marvell's Other Invalidity Defenses

Marvell acknowledges that it has not pursued its Section 112 defenses (written description, enablement, and indefiniteness) at trial.

IV. CONCLUSION

For the foregoing reasons, Marvell respectfully requests that the Court deny CMU's Motion for Judgment as a Matter of Law on Marvell's Invalidity Defenses.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on December 19, 2012, the foregoing was filed electronically on ECF. I also hereby certify that on December 19, 2012, this filing will also be served on counsel for CMU by electronic mail.

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